



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,299	11/10/2004	Kazuo Kohda	04445/HG	8137
1933 7590 08/22/2007 FRISHAUF, HOLTZ, GOODMAN & CHICK, PC 220 Fifth Avenue 16TH Floor NEW YORK, NY 10001-7708			EXAMINER CAMPANELLO, FRANCIS C	
			ART UNIT 1709	PAPER NUMBER
			MAIL DATE 08/22/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/501,299	Applicant(s) KOHDA ET AL.	
	Examiner Frank C. Campanell	Art Unit 1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-76 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-58 and 61-76 is/are rejected.
- 7) ☒ Claim(s) 12-14, 59 and 60 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some. * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>07/12/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Hnatow et al (US 5434330)

Regarding claims 1 and 2, Hnatow teaches a method for producing gas clathrate, comprising the steps of; mixing and dissolving step of mixing a raw material liquid with a raw material gas in a production- line of gas clathlate and dissolving the raw material gas into the raw material liquid; (see Figure 1, #25 and #26. #30 is the mixer which disperses the gas via fine bubbles. Also see column 5 lines 1-30). forming step of cooling the gas-dissolved raw material liquid while forcing the gas-dissolved raw material liquid to flow through a reaction conduit to form the gas clathlate. (see Figure 1, #20 and #29. Also see column 5 lines 1-30)

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 3-11, 15-38, 40-58, and 61-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spencer (US 6235092) as, and further in view of Hnatow et al (US 5434330).

Regarding claims 3-5, 7-11, 18-20, 25-33, 35-36, 38, 40-42, 48-49, 54-55,

Spencer teaches a method for producing gas clathrate, comprising the steps of:

mixing and dissolving step of mixing a raw material liquid with a raw material gas

Art Unit: 1709

in a production line of gas clathrate and dissolving the raw material gas into the raw material liquid; (See column 3 lines 55-65)

forming steps of cooling the gas-dissolved raw material liquid while forcing the gas-dissolved raw material liquid to flow through a reaction conduit to form the gas clathrate; (See figure 2 numbers 46, 52, and 48. Also see column 9 lines 25-42)

sending the formed gas clathrate together with the unreacted raw material gas and the raw material liquid through the reaction conduit to a separator; and separating the mixture into the gas clathrate, the unreacted raw material gas and the raw material liquid; (See bottom part of figure 1, Figure 2 number 48 and 50. Also see column 6 line 45 – column 7 line 15). This process concentrates the clathrates. The raw material gas and liquid are then recycled for later use. (See the figure on the first page and column 9 lines 10-30)

wherein, the mixing and dissolving step comprising mixing a raw material liquid with a raw material gas by using a mixer which is different from a reaction tank and dissolving the raw material gas into the raw material liquid; (See figure 2 column 9 lines 25-42. The vessel can be described as a reaction tube, not a tank. The flow in the tube is constant, there is no waiting/storage period in as in a tank.

Additionally, there is no reaction here besides the mixing of the gas and liquid.

The same type and amount of reaction takes place in applicants mixer.) and wherein,

the forming step comprising forcing the gas-dissolved raw material liquid to flow through a pipe-shaped reaction conduit which is different from a reaction tank and cooling the surface of the reaction conduit to form the gas clathrate. (See figure 2 column 9 lines 25-42.)

Spencer does not teach the mixer being a line mixer, nor the use of mixing the gas in the form of bubbles.

Hnatow teaches a method for producing gas clathrate, comprising the steps of; mixing and dissolving step of mixing a raw material liquid with a raw material gas in a production- line of gas clathrate and dissolving the raw material gas into the raw material liquid; (see Figure 1, #25 and #26. #30 is the mixer which disperses the gas via fine bubbles. Also see column 5 lines 1-30). forming step of cooling the gas-dissolved raw material liquid while forcing the gas-dissolved raw material liquid to flow through a reaction conduit to form the gas clathrate. (see Figure 1, #20 and #29. Also see column 5 lines 1-30);

Art Unit: 1709

sending the formed gas clathrate together with the unreacted raw material gas and the raw material liquid through the reaction conduit to a separator; and separating the mixture into the gas clathrate, the unreacted raw material gas and the raw material liquid; (See figure 1 number 23, and column 5 lines 30-65)

wherein, the mixing and dissolving step comprising mixing a raw material liquid with a raw material gas by using a line mixer dissolving the raw material gas into the raw material liquid; and wherein, (see Figure 1 #30. Also see column 5 lines 15-30. The use of a mixer is advocated, and in particular the use of a rotary propeller mixer (#40), and of spargers #28 and porous tubes #29 is cited. This allows for control of clathrate size from adjusting the amount of gas, controlled from the mass flow controller #24 and liquid flow from the circulating pump #36 in figure 1.) The raw material gas and liquid are then recycled for later use. (See numbers 34 and 35 in figure 1. Also see column 5 lines 40-65)

Hnatow does not teach the forming step comprising forcing the gas-dissolved raw material liquid to flow through a pipe-shaped reaction conduit which is different from a reaction tank and cooling the surface of the reaction conduit to form the gas clathrate.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process and apparatus of Spencer with the mixing apparatus and process taught by Hnatow to utilize the ability of Hnatow to create small bubbles, which allows for the efficient and complete mixing of the gas and liquid. It also creates "hydrate particles of small density that Allow the particles to settle out more slowly." See Hnatow column 4 lines 30-40. This process also saves on the cost of conventional agitators. See Hnatow column 2 lines 47-53.

Regarding claim 6, Spencer further teaches a dewatering treatment in the separating process. See the figure on the first page, The CO₂ exchange/Flash separates waters, and remaining clathrates and CO₂.

Regarding claims 15-17, Hnatow further teaches a circulating pump downstream of the mixer that would control and has the ability to increase or reduce flow speed. See figure 1. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the modify the process of Spencer with the circulating pump of Hnatow to facilitate the separation by reduction of pressure. See Hnatow column 9 lines 45-52.

Regarding claim 34, Spencer and Hnatow both teach a reaction zone with a temperature low enough and a pressure high enough to form clathrates. See Spencer column 9 lines 30-40 and Hnatow 5 lines 30-35.

Regarding claims 37,43-47, 50-52, 57-58,61-63, 65, and 67-74, Hnatow further teaches a means for detecting and controlling pressure in a separator. See figure 1 #37 and #32. Hnatow also teaches flow regulation of speed and pressure for the raw gas and raw liquid and separation process. See figure 1 #24, #33 and #36. It also would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Spencer with the circulating pump of Hnatow to facilitate the separation by reduction of pressure. See Hnatow column 9 lines 45-52. The pressure regulator in Hnatow is there to serve the purpose of controlling the pressure in the separator. For examples of speed regulation see column 11 lines 10-20. All the other claim limitation in claims 57-58, 61-63, 69-74 are covered in the first 103 rejection covering claims 3-5, and the 103 rejection of claim 34. Their rejection is listed here as they are dependant on a claim rejected in this paragraph.

Regarding claims 64 and 66. Hnatow does not specifically state the flow speed of the liquid through each of the conduits in the system. It would have been obvious to one of ordinary skill in the art at the time of the invention that the flow speed of the liquid would not be exactly the same between the myriad of conduits involved in

Art Unit: 1709

the reaction. There are two pumps, which would either pump the liquid at two different speeds. Or the speed of the liquid coming into the pump would be diminished by the stages involved. The speed of the liquid would therefore vary between conduit 35 before pumping and after slowing down and going through the separator and after the pump heading back to be recycled.

4. Claims 39, 75 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spencer (US 6235092) as, and further in view of Hnatow et al (US 5434330), and in further view of Heinemann et al (US 6028234). These three are all analogous art concerning the production of clathrates.

5. Regarding claims 39, 75 and 76 Spencer and Hnatow teaches the process and apparatus of 41 and 1. Spencer and Hnatow do not teach a detachable storage vessel for the clathrates. Heinemann teaches a clathrate formation zone and a detachable storage vessel. See Heinemann column 7 lines 35-65. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process and apparatus taught in Spencer with the detachable vessel Heinemann to facilitate easy storage and transportation of the clathrate for later use. See Heinemann column 7 lines 45-65.

6. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spencer (US 6235092) as, and further in view of Hnatow et al (US 5434330), and in further view of Baskis et al (US 5543061). These three are all analogous art concerning the production a gas/liquid slurry.

Regarding claim 56, Spencer and Hnatow teach the process of claim 54. Spencer does not specifically state which form the separator is to take. Spencer does state that any well known means of separation in the art can be used. See Spencer column 6 lines 27-42. Baskis teaches a cyclone separator. Baskis column 8 lines 55-65. Baskis does not teach a process to produce a clathrate. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process and apparatus of Spencer with the separator of Baskis to separate the heavy material and/or contaminants for the slurry.

Allowable Subject Matter

7. Claims 12-14, 59-60, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 12-14, a means of pressure regulation and the reactions conduit having a higher pressure than the mixer could not be found in the prior art.

Regarding claims 59 and 60, the apparatus of claim 57 and 58 with a pressure detection means at the exit of the reaction conduit could not be found in the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank C. Campanell whose telephone number is 571-270-3165. The examiner can normally be reached on Mon-Fri 8-5.

Art Unit: 1709

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

FCC


WALTER D. GRIFFIN
SUPERVISORY PATENT EXAMINER